

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference NM5218	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/IB 2002/002459	International filing date (<i>day/month/year</i>) 25.06.2002	Priority date (<i>day/month/year</i>)
International Patent Classification (IPC) or national classification and IPC H04Q 7/30		
Applicant Nokia Corporation et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
 - a. ☒ (*sent to the applicant and to the International Bureau*) a total of 8 sheets, as follows:

☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - b. ☐ (*sent to the International Bureau only*) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand 29.04.2003	Date of completion of this report 13.09.2004
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Stefan Hansson /OGU Telephone No. +46 8 782 25 00

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/IB 2002/002459

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1 - 27 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- pages _____ as originally filed/furnished
- pages* _____ as amended (together with any statement) under Article 19
- pages* 1 - 8 received by this Authority on 11.06.2004
- pages* _____ received by this Authority on _____
- ☒ the drawings:
- pages 1 - 6 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/IB 2002/002459

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-35</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-35</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-35</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The claimed invention

The claimed invention relates to a method and a network system for direct routing of the user plane of a call between two network terminals attached to a first and a second network respectively. After establishing the call, the transmission path for user data is changed such that it only comprises the access networks.

The claimed have been amended.

The following document are cited in the International Search Report:

D1: US 2002015392 A1
D2: EP 797319 A2
D3: EP 1172977 A1
D4: WO 0203725 A1
D5: EP 848527 A1

D1 relates to a method and a system for optimal routing of calls in a base station system. By introducing a plurality of new messages on the A-interface, the BSS can be informed that the Circuit Identity Codes (CICs) included in one of these messages can be connected to the BSS to provide optimal routing of one or more calls. The system described in D1 is IP-based.

However, according to the claimed invention, the use of direct transmission is negotiated between access-network elements without relying on the core network resources. In D1, the switching to a direct transmission path is always initiated and managed by the MSC in the core network.

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V.

D2-D5 merely relate to the state of the art and are not commented on further.

Consequently, the claimed invention as in claims 1-35 is novel, considered to involve an inventive step and has industrial applicability.

Berlin, 11 June 2004

Our Ref.: NM 5218-01WO OUN/LE
Direct Dial: 089/549 075 18

Applicant: NOKIA CORPORATION
Serial Number: PCT/IB2002/002459

Claims

1. A method for direct transmission of user data related to a call involving a first terminal device (10, 40) attached to a first access network and a second terminal device (12, 42) attached to a second access network comprising the steps of
 - establishing (S12, S46) a first transmission path (36, 62) for said user data, said first transmission path comprising
 - said first access network
 - a first core network communicating with said first access network,
 - a second core network communicating with said first core network, and
 - said second access network communicating with said second core network,
 - switching (S22, S24; S56, S58) from said first transmission (36, 62) path to a second transmission path (36', 62') for said user data, said second transmission path comprising a direct connection between said first access network and said second access network, wherein, before said step (S12, S46) of establishing said first transmission path for said user data, a step of establishing a third transmission path (34, 60) for control data related to said call is performed, and

wherein, before said step (S22, S24; S56, S58) of switching from said first transmission path to said second transmission path for said user data, a handshake (S16-S20; S50-S54) between at least one first access-network element involved in said first transmission path (36, 62) in said first access network and at least one second (32, 58) access-network element involved in said first transmission path in said second access network is performed, said handshake comprising a step of providing from the at least one first access-network element (14, 32; 44, 58) to the at least one second access-network element (14, 32; 44, 58) first control information indicating that said direct transmission of user data between said first and second access networks is possible.

2. A method according to claim 1, wherein said third transmission path (34, 60) comprises the same networks as said first transmission path (36, 62) for user data.
3. A method according to claim 1 or 2, wherein said third transmission (34, 60) path remains unchanged before and after said step (S22, S24; S56, S58) of switching from said first transmission path (36, 62) to said second transmission path (36', 62').
4. A method according to any one of the preceding claims, wherein said first (36, 62), second (36', 62'), and third (34, 60) transmission paths involve a first access-network element (14, 44) in said first access network, and a second access-network element (32, 58) in said second access-network.
5. A method according to claim 1, wherein said first control information comprises a first information element indicating that in relation to said call said first or second access-network element (14, 32; 44, 58) has the role of an originating or a terminating access-network element, respectively.
6. A method according to any one of claims 1 or 5, wherein said step (S14, S16) of providing said first control information is performed during said step (S12) of establishing a third transmission path (34) for control data related to said call.

7. A method according to any one of the preceding claims, wherein said step (S14, S50) of providing first control information comprises a step (S16, S50) of transferring second control information from said first access-network (14, 44) element to said second access-network element (32, 58), or vice versa, said second control information containing a transport address of said first (14, 44) or second access-network element (32, 58), respectively.
8. A method according to claim 7, comprising, before said step (S22, S24, S56, S58) of switching from said first transmission path (36, 62) to said second transmission path (36', 62') for said user data, a step (S18, S52) of responding to said second control information by transferring third control information from the access-network element receiving (32, 58) said second control information to the access-network sending (14, 44) said second control information, said third control information containing a transport address of the respective access-network element having received said second control information.
9. A method according to any one of the preceding claims, comprising, after said step (S22, S24; S56, S58) of switching from said first transmission path (36, 62) to said second transmission path (36', 62') for said user data, a step (S28, S60) of transferring fourth control information from said first access-network element (14, 44) to said first core-network element (20, 50) and/or (S26, S62) from said second access-network element (32, 58) to said second core-network element (26, 52), said fourth control information indicating that said step of switching from said first transmission path (36, 62) to said second transmission path (36', 62') for said user data related to said call has been performed successfully.
10. A method according to claim 9, comprising, after said step (S26, S28; S60, S62) of transferring said fourth control information, a step (S64, S66) of saving said fourth control information for later use by said first and/or second core-network element (20, 26), respectively.
11. A method according to claim 9 or 10, comprising, after said step (S26, S28) of transferring said fourth control information, a step (S30) of forwarding said fourth control information from said first and/or second core-

network element to further core-network elements in the first and/or second core-network, respectively, that are involved in said first transmission path (36, 62).

12. A method according to any one of the preceding claims, wherein, after said step of switching from said first transmission path (36, 62) to said second transmission path (36', 62') for said user data related to said call, a step (S32-S40) of switching back to said first transmission path for user data is performed under predetermined conditions.
13. A method according to claim 12, comprising, before said step (S32-S40) of switching back to said first transmission path, a step (S34) of transferring fifth control information from said first core-network element (20, 50) and/or said second core-network element (26, 52) to said first access-network element (14, 44) and/or said second access-network element (32, 58), respectively, said fifth control information indicating a request to switch back the transmission path for user data to said first transmission path (36, 62).
14. A method according to claim 12 or 13, comprising, before said step of switching back from said second transmission path (36', 62') to said first transmission path (36, 62) for said user data, a step (S36, S38) of performing a handshake between said first and second access-network elements.
15. A method according to any one of the claims 12 to 14, comprising, before said step of switching back to said first transmission path, a step (S36) of transferring sixth control information from the access-network element receiving (32, 58) said fifth control information to the other access-network element (14, 44) involved in said second transmission path (36', 62'), said sixth control information indicating a request to switch back the transmission path of user data to said first transmission path (36, 62).
16. A method according to claim 15, comprising, before said step of switching back to said first transmission path, a step (S38) of transferring seventh control information from the access-network element receiving (14, 44) said sixth control information to the access-network element sending (32, 58) said sixth control information, said seventh control information indicat-

ing acknowledging the coming switch back of the transmission path of user data to said first transmission path (36, 62).

17. A method according to any one of claims 12 to 16, comprising, after said step of switching back to said first transmission path, a step (S40, S42) of transferring eighth control information from said first (14, 44) and/or second (32, 58) access-network element to said first (20, 50) and/or second (26, 52) core network element, said eighth control information indicating that said step of switching back to said first transmission path has been performed successfully.
18. A method according to any one of the preceding claims, comprising, before said step (S22, S24; S56, S58) of switching from said first transmission path (36, 62) to said second transmission path (36', 62') for said user data, a step of transferring ninth control information from said first and/or second access-network elements to said first and/or second core-network elements, respectively, said ninth control information indicating that switching to said second transmission path is intended.
19. A method according to claim 18, comprising, before said step (S22, S24; S56, S58) of switching from said first transmission (36, 62) path to said second transmission path (36', 62') for said user data, a step of transferring tenth control information from said first or second core-network elements to said first and/or second access-network elements, respectively, said tenth control information indicating authorization to switch to said second transmission path.
20. A method according to any one of the preceding claims, wherein said call is of a circuit-switched connection type.
21. A method according to claim 20, wherein said step (S12) of establishing said third transmission path for control data comprises a step of negotiating a mechanism of coding and decoding of user data between the networks.
22. A method according to claim 20 or 21, wherein said step (S14, S16) of transferring said first and/or said second control information from said first access-network (14) element to said second access-network element (32) is performed using said third transmission path (34).

23. A method according to any one of claims 1 to 19, wherein said call is of a packet-switched connection type.
24. A method according to claim 23, wherein said step (S50) of transferring said first control information from said first access-network element (44) to said second access-network element (58) is performed using said first transmission path (62) for user data.
25. A method according to claim 24, wherein said first control information is contained in a first data packet transferred between said first (44) and second access-network elements (58) after said step of establishing said first transmission path (62).
26. A method according to claim 24 or 25, wherein said first and/or second control information is contained in at least one extension header of said first data packet, and said second control information comprises said transport address of the access-network element sending said first data packet.
27. A method according to any one of the claims 23 to 26, wherein said step (S50) of transferring said second control information from said first access-network element (44) to said second access-network element (58) comprises a step of forwarding said second control information from said first core-network element (50) to said second core-network element (52) in a second data packet.
28. A method according to any one of the claims 23 to 27, wherein said step of forwarding said control information from said first core-network element (50) to said second core-network element (52) comprises a step of copying said extension header to said second data packet.
29. A method according to any one of claims 23 to 28, wherein said step (S52) of responding to said second control information comprises a step of transferring said third control information in a third data packet from the access-network element receiving said second control information to the access-network element sending said second control information.
30. A method according to claim 29, wherein said third control information is contained in at least one extension header of said first data packet, and

said third control information comprises said transport address of the access-network element receiving said first data packet.

31. A first network element for controlling the operation of at least one transceiver station in a first access network in relation to a call between a first network terminal (10, 40) attached to said first access network and a second network terminal (12, 42) attached to a second access network, comprising
- at least one first interface adapted to exchange control information and user data with said transceiver station,
 - at least one second interface adapted to exchange control information and user data with a first core-network,
 - a first call control unit connected to said first interface, and adapted to establish, maintain and release across said first interface in relation to said call a first control-channel section for transmission of control information and a first user-channel section for transmission of user data, said first control- and user-channel sections having as endpoints said network element and said transceiver station,
 - a second call control unit communicating with said first call control unit and connected to said second interface, adapted to establish, maintain and release across said second interface in relation to said call a second control-channel section for transmission of control information and a second user-channel section for transmission of user data, said second control- and user-channel sections having as endpoints said first network element and a predetermined core-network element in said first core-network,
 - wherein said first call control unit is additionally adapted to establish, maintain and release across said first interface a third user channel-section for user data related to said call having as endpoints said first network element and a second network element in said second access network, respectively, and
 - wherein said first network element is adapted to perform a handshake (S16-S20; S50-S54) directly between said first network element and said second network element after establishing said second control channel section and before establishing said third user channel section, said

handshake comprising a step of providing from the first network element to the second network element (14, 32; 44, 58) first control information indicating that said direct transmission of user data between said first and second access networks is possible.

32. A network element according to claim 45 that is adapted to releasing said second user-channel section after said third user channel section is established.
33. A network element according to claim 45 or 46, that is adapted to assess whether an ongoing call is eligible for establishing said third user channel section.
34. A network element according to any one of claims 45 to 47, additionally adapted to perform method steps according to any of the claims 1 to 30.
35. Network system comprising a network element according to any one of claims 31 to 35.